What is claimed is:

1. A method of transplanting hematopoietic cells from a donor source into a genetically unrelated recipient, comprising:

a) administering to the recipient, in combination with the administration of the hematopoietic cells, an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the recipient and facilitate engraftment of the hematopoietic cells in the recipient; and

b) administering to the recipient an effective amount of hematopoietic cells.

2. The method of claim 1, wherein the mononuclear cells are Γ cells.

3. The method of claim 1, wherein the mononuclear cells are natural killer cells.

4. The method of claim 1, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

5. The method of claim 1, wherein the cells are treated with a chemotherapeutic agent.

6. The method of claim 5, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine) and 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78).

7. A method of treating or preventing an infection in a recipient of genetically unrelated hematopoietic cells, comprising administering to the recipient, in combination with the administration of the hematopoietic cells, an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the recipient, and which are effective in treating or preventing the infection.

8. The method of claim 7, wherein the mononuclear cells are T cells.

9. The method of claim 7, wherein the mononuclear cells are natural killer cells.

10. The method of claim 7, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

11. The method of claim 7, wherein the cells are treated with a chemotherapeutic agent.

12. The method of claim 11, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine) and 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78).

13. The method of claim 7, wherein the infection is caused by a virus.

14. The method of claim 13, wherein the virus is cytomegalovirus.

15. A method of enhancing immune reconstitution in a transplant recipient, comprising administering to the recipient, in combination with a transplant, an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the recipient, and which are effective in enhancing immune reconstitution in the recipient.

16. The method of claim 15, wherein the mononuclear cells are T cells.

17. The method of claim 15, wherein the mononuclear cells are natural killer cells.

18. The method of claim 15, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

19. The method of claim 15, wherein the cells are treated with a chemotherapeutic agent.

20. The method of claim 19, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine) and 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78).

21. A method of enhancing immune reconstitution in a subject diagnosed with cancer, comprising administering to the subject an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the subject, and which are effective in enhancing immune reconstitution in the subject.

22. The method of claim 21, wherein the mononuclear cells are T cells.

23. The method of claim 21, wherein the mononuclear cells are natural killer cells.

24. The method of claim 21, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

25. The method of claim 21, wherein the cancer originates in a solid organ.

26. The method of claim 21, wherein the cancer originates in hematopoietic tissue.

27. The method of claim 21, wherein the cancer is metastatic.

28. The method of claim 21, wherein the cells are treated with a chemotherapeutic agent.

29. The method of claim 28, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine), 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78) and S-59 psoralen activated by ultraviolet A light.

30. A method of treating or preventing an infection in a genetically unrelated solid organ transplant recipient, comprising administering to the recipient, in combination with the transplant, an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the recipient, and which are effective in treating or preventing the infection.

31. The method of claim 30, wherein the mononuclear cells are T cells.

32. The method of claim 30, wherein the mononuclear cells are natural killer cells.

33. The method of claim 30, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

34. The method of claim 30, wherein the infection is caused by a virus.

35. The method of claim 34, wherein the virus is cytomegalovirus.

36. The method of claim 30, wherein the cells are treated with a chemotherapeutic agent.

37. The method of claim 36, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine) and 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78) and psoralen activated by ultraviolet A light.

38. A method of treating or preventing an infection in a subject, comprising administering to the subject an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the subject, and which are effective in treating or preventing the infection.

39. The method of claim 38, wherein the mononuclear cells are T cells.

40. The method of claim 38, wherein the mononuclear cells are natural killer cells.

41. The method of claim 38, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

42. The method of claim 38, wherein the subject is immunocompetent.

43. The method of claim 42, wherein the subject is HIV positive.

44. The method of claim 38, wherein the subject is immunocompromised.

45. The method of claim 44, wherein the subject is HIV positive.

46. The method of claim 38, wherein the subject is a neonate.

47. The method of claim 38, wherein the subject requires augmentation of cellular immunity.

48. The method of claim 38, wherein the infection is caused by a virus.

49. The method of claim 48, wherein the virus is cytomegalovirus.

50. The method of claim 38, wherein the cells are treated with a chemotherapeutic agent.

51. The method of claim 50, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine), 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78) and S-59 psoralen activated by ultraviolet A light.

52. A method of treating cancer in a subject diagnosed with a cancer, comprising administering to the subject an amount of mononuclear cells which are treated so as to substantially reduce their ability to cause graft versus host disease while they retain their ability to proliferate in the subject, and which are effective in treating the cancer.

53. The method of claim 52, wherein the mononuclear cells are T cells.

54. The method of claim 52, wherein the mononuclear cells are natural killer cells.

55. The method of claim 52, wherein the mononuclear cells are a mixture of T cells and natural killer cells.

56. The method of claim 52, wherein the cancer is leukemia.

57. The method of claim 52, wherein the cells are treated with a chemotherapeutic agent.

58. The method of claim 57, wherein the chemotherapeutic agent is selected from the group consisting of 9-D-arabinofuranosyl-2-fluoroadenosinemonophosphate (fludarabine), 2'-deoxcoformycin (pentostatin), 2-chlorodeoxyadenosine (2CDA), 6-mercaptopurine (6-MP), 6-thioguanine (6-TG), 2'-deoxy-2', 2'-difluorocytidine (gemcitabine), 2-amino-9-D-arabinosyl-6-methoxy-9-H-purine (Ara-G, 506U78) and S-59 psoralen activated by ultraviolet A light.